

**IN RE:**  
**RONALD A. KATZ**  
**SERIAL NO: 10/724,330**

**FOREIGN PATENT:**

**Sho 54-60000 JAPAN**

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Thomas Wilds

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**(54) Automatic Vending Apparatus**

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### Specification

#### 1. Title Of The Invention.

Automatic Vending Apparatus

#### 2. Scope Of Patent Claim.

(1) Automatic vending apparatus that furnishes: (a) a display unit that visually asks questions regarding articles that a customer wants by visual displays of reservation requisites, (b) at least two switches for inputting answers to the questions in the display unit, (c) apparatus that identifies counterfeit money deposited, (d) apparatus that discharges money for change, (e) article delivery machinery that delivers articles wanted by the customer to an extraction opening, and (f) an operation control apparatus that controls the display unit, counterfeit identification unit, money discharge unit and article delivery machinery, stores details on reservations as to whether or not a switch has been pressed for a question item from the display means, inquires as to whether or not there is

a specific article by means of the stored details on reservations, and in certain cases gives commands to the article delivery machinery for processing of money in terms of the amount deposited and the article cost.

(2) Automatic vending apparatus described in Scope of Patent Claim Paragraph 1 wherein the said display apparatus is apparatus that successively displays reservation requisites for different reservation items.

(3) Automatic vending apparatus for designated seat tickets described in Scope of Patent Claim Paragraph 1 and Paragraph 2 wherein the said display apparatus is apparatus that displays an arrow mark in addition to the reservation requisites and asks questions by shifting its display position to the display positions of the reservation requisites one at a time.

(4) Automatic vending apparatus described in Scope of Patent Claim Paragraph 1 and Paragraph 2 wherein the said display apparatus is apparatus that displays the displayed reservation requisites as specified codes, and the said switches individually correspond to the said codes.

(5) Automatic vending apparatus described in Scope of Patent Claim Paragraph 1 and Paragraph 2 wherein the said switches are plurally furnished to correspond individually to the display positions of the reservation requisites displayed in a display window of the said display apparatus.

(6) Automatic vending apparatus described in any of Scope of Patent Claim Paragraph 1 through Paragraph 5 wherein the said display apparatus is apparatus that displays reservation details stored in the said operation control apparatus.

### **3. Detailed Explanation Of The Invention.**

The present invention relates to apparatus that automatically sells such as designated tickets.

When selling so-called designated tickets that reserve seats or equipment such as limited express tickets, sleeping car tickets and express designated seat tickets, the tasks of operating computer terminals, handing over the tickets and processing the money are still done manually even though available seats inquiries and issuing of tickets are done with electronic computers. This leads to increases in the number of ticket windows for designated tickets, requires more ticket windows to be build, requires the windows to stay open longer and leads to inconveniences for users.

Automatic vending machines are being proposed in order to remove such deficiencies. However, in order to issue designated tickets it is necessary that the customer be able to select and designate the details of his reservation item by item from among numerous reservation requisites (these are requisites individually included in each reservation item, for example 1 ticket, 2 tickets, 3 tickets, ... when the reservation

item is the quantity of tickets), in regard to reservation items such as type of ticket (ordinary ticket or special ticket), departure date, train name, train number, departure intervals and quantity of tickets. Because of this they are constructed with pushbutton methods the same as used in prior automatic vending machines, furnishing plural selecting pushbutton switches corresponding to each reservation requisite for each reservation item, and the customer inputs his reservation details by depressing multiple pushbutton switches as he desires. Accordingly the operation face (the service panel) becomes complicated, and since complicated operations must be done there are inconveniences for inexperienced customers, and since there are limitations to the number of pushbutton switches there are limitations in the extent to which designated tickets may be sold, and for these and other reasons they are not being brought into practical use.

Consequently designated tickets are being sold at ticket windows where the user has to fill in the required items on an application form, which is a very troublesome deficiency.

Although automatic vending machines other than ticket vending machines have been variously proposed and offered for practical use, there are limitations in the numbers of selection buttons that can be installed on the front of a machine, so there have been limitations in the types of articles that could be sold by a single automatic vending machine.

The present invention has the object of offering an automatic vending apparatus for articles that customers want that first asks question by displaying such as characters in display apparatus so that the answers to these questions can be input with a small number of pushbutton switches, one that is miniaturized while increasing the number of articles that can be sold, and further one whose operation is made very simple.

An example will be explained below with reference to the drawings.

Fig. 1 is an example of the service face of an automatic vending machine used only for limited express tickets. In the figure, 1 is a guide display portion with characters signifying the fact that the automatic vending machine is exclusively for limited express tickets, for example the characters "Limited Express Ticket Automatic Vending Machine", 2 is a guide display portion that displays "Open For Sales" or "Sales Suspended" corresponding to whether or not this automatic vending machine can be used, 3 is a guide display portion that displays characters when it is possible to use the automatic vending machine, these characters being for example "Welcome! Please operate the machine as instructed by the displays below", 4 is a place where an interphone connected to telephone apparatus in a security room (not illustrated) is installed, 5 is a cancellation pushbutton for terminating ticket purchases and 6 is a pushbutton for calling an attendant.



8 is a coin deposit opening, 9 is a paper bill deposit opening, and 10 is a paid amount display portion. Inside of deposit opening 8 is a known detection device, and inside of deposit opening 9 is a known paper bill differentiation device. Display portion 10 is a display portion with a known display apparatus that displays total amounts of deposits, above it are written the characters for "Total Deposited", and the character for "Yen" is written to its right.

11 is a display portion for the designated ticket fare for which the reservation was made, above it are written the characters for "Fare", and to its right is written the character for "Yen."

18 is a display portion with a display device giving successive readable displays of each reservation requisite by reservation item, for example "Your request,  $\Rightarrow$  mark, ?" corresponding to reservation, arrow mark, reservation details. Thus it is constructed so that the customer can be questioned about the reservation details by successively shifting the display position of the arrow mark relative to the display position of each reservation element. The said display device may be a known display device such as a Braun tube display device or plasma display apparatus.

19a, 19b and 19c are pushbutton switches for answers that correspond to "Yes", "No" and "Correction", and these characters are also displayed over the switches. When

pushbutton switch 19a is depressed the display details of display window 18 change to those of the next requisite of the reservation item, and when pushbutton switch 19b is depressed the arrow mark display apparatus shifts to the display position of the next reservation requisite.

20 is a receiving opening for tickets, change, returned coins and returned paper money.

An example of the essential parts of the electric circuit of the automatic vending machine described above will be explained next. In Fig. 2, 19a, 19b and 19c are pushbutton switches illustrated in Fig. 1 and are individually connected to operation control circuit 21. 22 is a known detector that detects counterfeit coins that are deposited, 23 is a known paper bill discriminator that detects counterfeit paper bills that are deposited, detector 22 and discriminator 23 operate when money is deposited and supply signals signifying that the money is good to operation control circuit 21. 24 is a display device for the total amount deposited, 25 is a display device for the fare of the ticket sold, and these display devices 24 and 25 are controlled by operation control circuit 21.

26 is a known coin change discharge machine that discharges coins for change from a coin safe, and 28 is a known return machine that returns deposited paper money. Discharge machine 26 and return machine 28 are controlled by operation control circuit 21.

29 is a ticket issuing machine that issues designated tickets and is controlled by operation control circuit 21 when seat reservations have been completed and the sales conditions have been established. Ticket issuing machine 29 can use a known ticket issuing machine with a dot printer that prints various types of information on tickets with clusters of dots and issues the tickets by editing the ticket face format as required by the information given.

30 is memory that stores control programs for each machine and device depending on operation control circuit 21.

31 comprises display units that can visually display characters in display window 18 in Fig. 1 based on signals inputted from operation control circuit 21, furnishing display device 32, control circuit 33 for this display device 32, edit circuit 34 for editing display formats, pattern memory 35 and character memory 36, and the output signals from operation control circuit 21 input to edit circuit 34. Edit circuit 34 edits display formats based on the pattern memory and supplies them to control circuit 33 when receiving display commands input from operation control circuit 21. Control circuit 33 uses the inputted pattern information to read out prescribed character signals from character memory 36 and displays the prescribed pattern in display device 32.

37 is a known modem that sends and receives signals between itself and reservation file unit 38 furnished in a

central apparatus. Reservation file unit 38 is known apparatus that remembers whether or not there are reservations for all designated seats on a train.

Operation control circuit 21 is furnished with the functions of: (a) controlling display unit 31 with a circuit that controls each piece of equipment in this automatic vending machine following programs previously loaded in control memory 30, (b) reading data such as from selection switches 19a, 19b and 19c, (c) sending and receiving data to and from reservation file unit 38, (d) successively storing the reservation details that are input by the passenger, (e) money processing functions such as amount of deposit totals and change calculations, and (f) storage of sales proceeds.

During the standby condition when the said automatic vending machine is waiting to be used by a customer, operation control circuit 21 inputs display command signals to display unit 31. In response, display unit 31 edits a first display format and visually displays the first question item in display device 32. As shown in Fig. 3(A), the first display format is constructed of the first question item comprising characters  $a_1$  which are "Welcome! Is the  $\Rightarrow$  mark at your request?", arrow mark  $a_2$ , and characters  $a_3$  and  $a_4$  which are "Ordinary Ticket" and "Special Class Ticket", in addition to groups of characters  $a_5$  showing the titles of all reservation items required. Arrow mark  $a_2$  goes on and off, and is first shown at characters  $a_3$  for

"Ordinary Ticket." Consequently the user standing in front of the machine can know that this means "Do you want an ordinary ticket?" He can then answer the question by depressing pushbutton switch 19a if he wants an ordinary ticket or depressing pushbutton switch 19b if he wants a special class ticket, thus inputting an answer to the question item.

If he depresses pushbutton switch 9a, operation control circuit 21 stores the fact that the ticket desired is an ordinary ticket, and sends a command to display unit 31 that changes the display details to the second display format. However, if he depresses pushbutton switch 19b, it sends a command to display unit 31 to shift the display location of arrow mark a2, which causes display unit 31 to shift the display position to that indicating characters a4 for "Special Class Ticket." Consequently, at this point the user can know the fact that the question item is "Do you want a special class ticket?" and if he does want a special class ticket he may depress pushbutton switch 19a. If pushbutton switch 19a is depressed at this point in time, operation control circuit 21 stores the fact that the desired ticket is a special class ticket, sends display unit 31 a command to change the display format to the second display format, and operation control unit 31 edits the second display format and gives a visual display of the second question item in display device 32.

As shown in Fig. 3(B), the second display format is constructed of: (a) second question items comprising characters  $b_1$  that are "Is the  $\Rightarrow$  mark at the number of tickets you want?", (b) arrow mark  $b_2$ , (c) character group  $b_3$  signifying the number of tickets as 1, 2, ..., and (d) character group  $b_4$  representing the titles of all reservation details required for issuing designated tickets. In character group  $b_4$ , the characters for "Special Class Ticket" (or "Ordinary Ticket") are displayed as an item after type of ticket. Consequently the user at this point in time can understand that he has asked for a special class ticket (or ordinary ticket) and that the question item now is how many adult tickets, and he may depress either one of pushbutton switches 19a and 19b so that the position of arrow mark  $b_2$  matches the number of tickets he wants.

While the second question item is being displayed in this manner, operation control circuit 21 sends to display unit 31 a command to shift the display position of arrow mark  $b_2$  each time pushbutton switch 19b is depressed, and when pushbutton switch 19a is depressed it stores the number indicated by arrow mark  $b_2$  at that time, while sending display unit 31 a command to change the display details to the third display format. When pushbutton 19b is depressed at a time when arrow mark  $b_2$  shows the number "5", operation control circuit 21 returns arrow mark  $b_2$  once more to the position

where it indicates the number "1" and the second question is asked again [sic].

Then operation control circuit 21 and display unit 31 operate in similar fashions to store answers to inputs responding to successive displays of questions regarding reservation details comprising the number of child tickets, departure date, train station name, train number, boarding station and detraining station.

When the display for each question item in each reservation item and the accumulation of the answers thereto are completed, operation control circuit 21 sends display unit 31 a display command to verify the accumulated reservation details, so that as shown in Fig. 3(C), display device 32 displays characters  $c_1$  that read "The operation is finished. Are the details correct" and character group  $c_2$  showing the accumulated reservation details. Consequently if the reservation details are correct the customer can depress pushbutton switch 19a, or if there are errors he can depress pushbutton switches 19b or 19c.

If he depresses pushbutton switches 19b or 19c while the question item for verification of reservation details is being displayed, operation control circuit 21 sends display unit 31 a command to change the display details to a format for determining items to be corrected, and display unit 31 displays character group  $d_1$  and arrow  $d_3$  as shown in Fig. 3(D). After

this the position of arrow d<sub>3</sub> shifts successively every time pushbutton switch 19b is depressed to identify the location to be corrected. When the item to be corrected is the number of adult tickets, the second question is again displayed so corrections can be made, and then the question item for verifying the reservation details is redisplayed.

When pushbutton switch 19a is depressed in answer to the question for verifying the reservation details, there is a display in display window 18 that says "We are now making your reservation. Please wait a moment." Operation control circuit 21 transmits the reservation details in storage to reservation file unit 38 via modem 37 to initiate an inquiry for available seats. When there are no seats available it supplies display unit 31 with a signal signifying to that effect, which causes display unit 31 to display the message "The train you requested is full." Or in cases when there are seats available, operation control circuit 21 supplies a signal to display unit 31 to display the message "Seats are available. Please deposit the money." while at the same time the fare amount displays in display portion 11, the customer is informed by both of these actions, and money deposit openings 8 and 9 open to receive the money.

When the deposited amount is equal to or over the fare, operation control circuit 21 closes the deposit openings, does processing relative to the deposit amount and the fare mount,



and supplies the ticket issuing machine with a ticket issuance command signal, sending change discharge machine 26 a signal to discharge the change when that is required. When ticket issuance and change discharge are completed, display window 18 and each item of equipment return to the standby state.

Because the above apparatus displays the reservation essentials broken down into reservation items and asks questions regarding the tickets wanted by the customer with characters and the arrow mark, the customer can merely depress either of pushbutton switches 19a and 19b meaning "Yes" and "No" in response to the questions, making the operation extremely simple.

Also, because the reservation requisites are displayed successively as reservation requisites that are few in number, being type of ticket, quantity of adult tickets, quantity of child tickets, and so on. That is, if for example the departure station and arrival station were initially displayed it would be necessary to display all the station names, but when they are displayed after the departure date, train name and train number, only the stops for the train specified by departure date, train name and train number need to be displayed.

In the above example, when pushbutton switches 19a, 19b and 19c are depressed within a fixed time after display unit 31 starts a given question, pressing of a pushbutton switch may be prompted by a display or by processing that suspends

the ticket purchasing. It is also possible to use similar methods to handle situations where the amount deposited is not enough for the ticket fare.

Although the above example is an automatic vending machine for use exclusively with limited express tickets, the present invention can also be applied to automatic vending machines dedicated to designated tickets other than limited express tickets such as sleeping car tickets and limited express designated seat tickets, as well as to automatic vending machines capable of selling any designated ticket.

Although the above example asks various questions with an arrow mark while displaying the reservation requisites lumped together under a reservation item, it can also be made to ask various questions relative to the reservation requisites, for example asking "Do you want an ordinary ticket?"

Further as shown in Fig. 4, instead of asking questions by the position of the arrow mark it is also possible to specify the displayed reservation requisites by codes such as "1", "2", "3" and so on and then depress a pushbutton switch corresponding to the reservation detail one wishes. In this case pushbutton switches for the individual codes and/or ten-key keypads 39a and 39b as shown in the drawing could be furnished on the service face instead of pushbutton switches 19a, 19b and 19c.

As illustrated in Fig. 5, it is also possible to furnish plural pushbutton switches 40 in places corresponding to the display

positions of the reservation requisites, while displaying characters at the top of display window 18 saying "Welcome! Please press the button you wish at the left side", and displaying each reservation essential element in positions corresponding to pushbutton switches 40. When this is done the processing capability is increased because one only needs to press a button for a reservation item once even though there are many reservation requisites.

Although the above example relates to an automatic vending machine for designated tickets, it is possible to sell articles other than designated tickets and display the characters "Which would you like?" and characters for the articles being sold such as "Cigarettes", "Chocolate", "Carmels" and "Gum" instead of the reservation requisites. Then if the customer wants "Cigarettes" the types of cigarettes, for example "Highlight" or "Cherry" can be shown, followed by displays for the number of packs. When this is done it becomes possible to sell many types of articles with a single automatic vending machine.

Because the present invention as described above is one where the customer is asked questions about the article he wants with a display unit and answers those questions with pushbutton switches, the switches become fewer in number, consequently the service face is simplified, the apparatus is miniaturized, the cost is decreased and it becomes possible to

increase the types of articles that can be sold, and so it offers effects such as very simple operation and great convenience to users.

#### 4. Brief Explanation Of The Drawings.

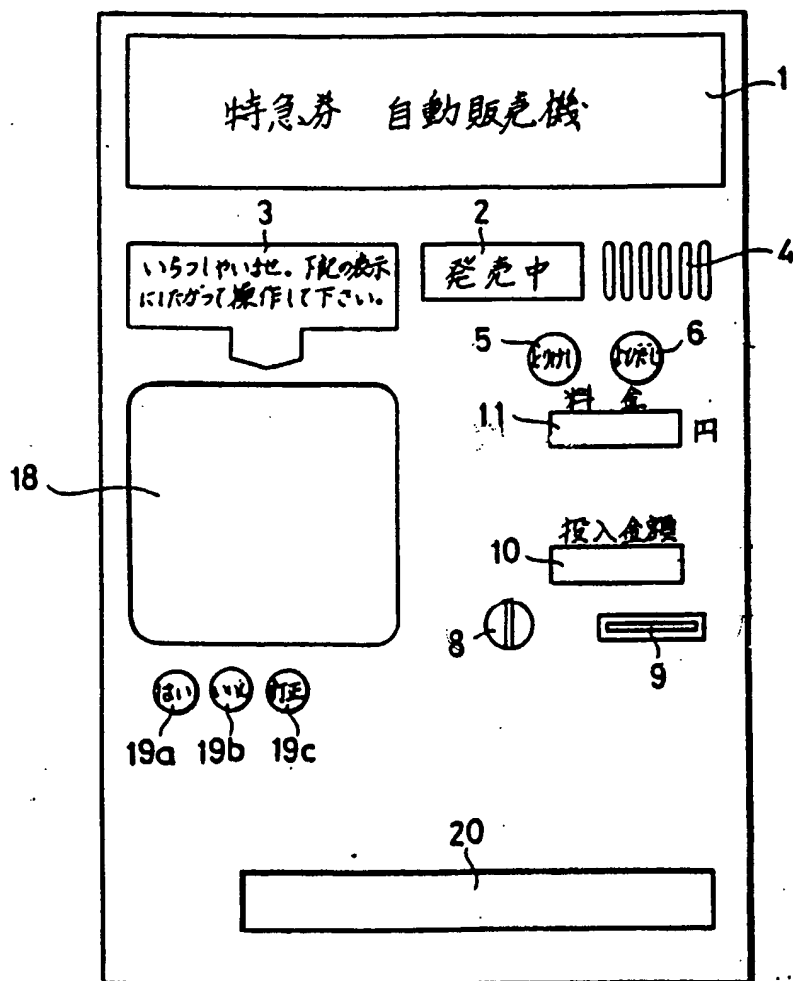
Fig. 1 is a diagram of an example of the service face of an automatic vending apparatus, Fig. 2 is a block diagram illustrating an example of the essential portion of an electric circuit, Fig. 3 is an explanatory diagram of displayed details, Fig. 4 is another explanatory diagram of the display method for question items and the pushbuttons for service, and Fig. 5 is a diagram of an example of the display method for question items and the pushbuttons for service.

8	Coin deposit opening
9	Paper bills deposit opening
18	Display window of display unit
19a, 19b, 19c, 39a, 39b, 40:	Pushbutton switches
21	Operation control circuit
22	Coin detector
23	Paper bill discriminator
26	Coin for change discharger
29	Ticket issuer
30	Memory for control use
31	Display unit
37	Modem
38	Reservation file unit

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Nomura

Fig. 1

図 1



**Fig. 1. Continued**

- 1 Limited Express Ticket Automatic Vending Machine
- 2 Open For Sales
- 3 Welcome! Please operate the machine as instructed by  
the displays below
- 5 Cancel
- 6 Call Button
- 10 Amount Deposited
- 11 Fare Yen
- 19a Yes
- 19b No
- 19c Correction

Fig. 2

图 2

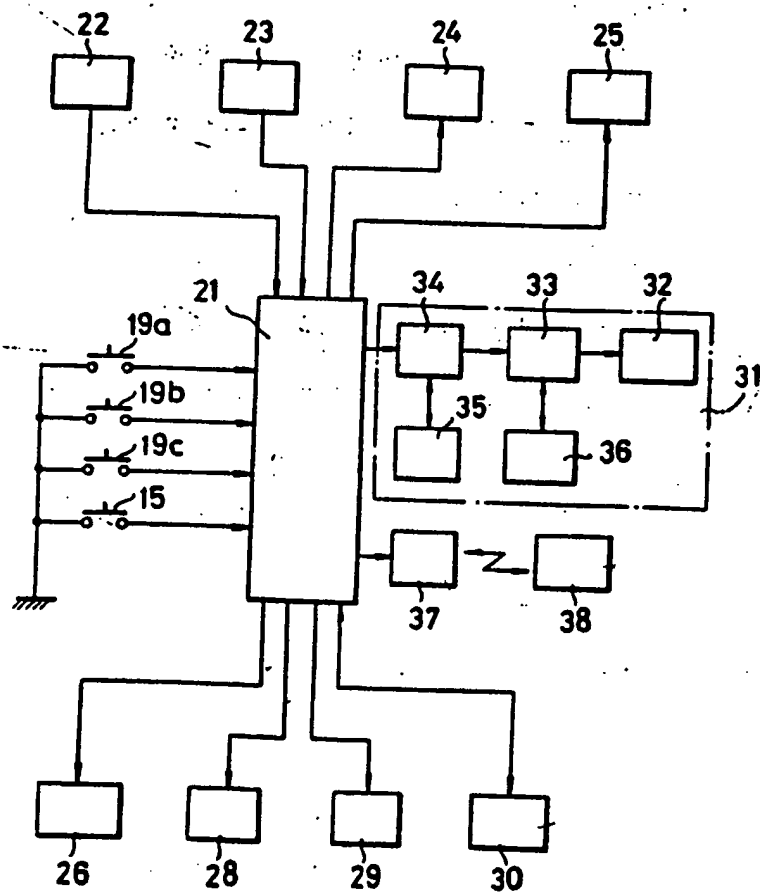




图 3 (A)

いらつやいませ。ご希望は⇒印ですか?

⇒ 普通券 —  $a_3$

特等券 —  $a_4$

.....予約の内容.....

1 種類	.....	券
2 大人券	.....	枚
3 小人券	.....	枚
$a_5$ 4 乗車日	.....	日
5 列車名	.....	
6 列車番号	.....	
7 乗車駅	.....	駅
8 下車駅	.....	駅

Welcome! Is the ⇒ mark at your request?

Ordinary Ticket

Special Class Ticket

Ticket Details

1	Type	Ticket
2	Adult Ticket	Quantity
3	Child Ticket	Quantity
4	Departure Date	Date
5	Train Name	
6	Train Number	
7	Departure Station	Station
8	Arrival Station	Station

Fig. 3(B)

第 3 図 (B)

b<sub>1</sub>

大人券の枚数は ⇒ 印ですか?

b<sub>2</sub> →

1 }  
2 }  
3 } b<sub>3</sub>  
4 }  
5 }

18

--- 予約の内容 ---

b<sub>4</sub> {

1	種類	特等	券
2	大人券	.....	枚
3	小人券	.....	枚
4	乗車日	.....	日
5	列車名	.....	
6	列車番号	.....	
7	乗車駅	.....	駅
8	下車駅	.....	駅

Is the ⇒ mark at the number of adult tickets you want?

### Ticket Details

1	Type	Special Class	Ticket
2	Adult Ticket		Quantity
3	Child Ticket		Quantity
4	Departure Date		Date
5	Train Name		
6	Train Number		
7	Departure Station		Station
8	Arrival Station		Station

Fig. 3(C)

操作は終了しました。内容は正しく入力されましたか?

.....予約の内容.....

1	種類	特等	券
2	大人券	2	枚
3	小人券	0	枚
4	乗車日	3	日
5	列車名	スカイライト	
6	列車番号	101	
7	乗車駅	押上	駅
8	下車駅	成田空港	駅

The operation is finished. Are the details correct?

### Ticket Details

1	Type	Special Class	Ticket
2	Adult Ticket	2	Quantity
3	Child Ticket	0	Quantity
4	Departure Date	3	Date
5	Train Name	Skylight	
6	Train Number	1-1	
7	Departure Station	Oshiage	Station
8	Arrival Station	Narita Airport	Station

Fig. 3(D)

訂正箇所は⇒ですか?

$d_1$

.....予約の内容.....

$d_3$  ⇒

1	種類	特等	券
2	大人券	2	枚
3	小人券	0	枚
4	乗車日	3	日
5	列車名	スカイライト	
6	列車番号	101	
7	乗車駅	押上	駅
8	下車駅	成田空港	駅

$d_2$

18

Is the ⇒ mark at the place to be corrected?

### Ticket Details

1	Type	Special Class	Ticket
2	Adult Ticket	2	Quantity
3	Child Ticket	0	Quantity
4	Departure Date	3	Date
5	Train Name	Skylight	
6	Train Number	1-1	
7	Departure Station	Oshiage	Station
8	Arrival Station	Narita Airport	Station

Fig. 4

券 4 図

いらつしやいませ。ご希望の券と同じ番号の釦を  
押して下さい。

1 普通券

2 特等券

……予約の内容……

1 種類 …… 券  
2 大人券 …… 枚  
3 小人券 …… 枚  
4 乗車日 …… 日  
5 列車名 ……  
6 列車番号 ……  
7 乗車駅 …… 駅  
8 下車駅 …… 駅

18

39a

7	8	9
4	5	6
1	2	3
0		訂正

全訂正

39b

**Fig. 4 Continued**

Welcome! Please press press the keys for the numbers  
for the ticket you want.

Ordinary Ticket

Special Class Ticket

**Ticket Details**

1	Type	Ticket
2	Adult Ticket	Quantity
3	Child Ticket	Quantity
4	Departure Date	Date
5	Train Name	
6	Train Number	
7	Departure Station	Station
8	Arrival Station	Station

[On keypad:]

Correction

[At 39b:]

Total Correction

Fig. 5

いらっしゃいませ。ご希望の左側の 鈕を押して下さい。

普通券  
特等券

---予約の内容---

1 種類	.....	券
2 大人券	.....	枚
3 小人券	.....	枚
4 発車日	.....	日
5 列車名	.....	
6 列車番号	.....	
7 発車駅	.....	駅
8 下車駅	.....	駅

Welcome! Please press a button at the left for what you want.

Ordinary Ticket

Special Class Ticket

Ticket Details

1	Type	Ticket
2	Adult Ticket	Quantity
3	Child Ticket	Quantity
4	Departure Date	Date
5	Train Name	
6	Train Number	
7	Departure Station	Station
8	Arrival Station	Station

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